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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Artificial Intelligence & Machine Learning) / (CSE) (Sem.-5)

FORMAL LANGUAGE & AUTOMATA THEORY

Subject Code : BTCS-502-18

M.Code : 93172

Date of Examination : 23-11-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :

- a) What is Chomsky Classification of formal languages?
- b) What are recursive definitions?
- c) What is a transition graph?
- d) What are the basic operations for strings?
- e) What is ambiguity?
- f) Define intersection of two languages.
- g) Explain the concept of Unit Production.
- h) Define mathematical induction.
- i) Define terminal and non-terminal symbol.
- j) State Cook Levin Theorem.

SECTION-B

2. What is NFA? Show with the help of graph.
3. State pumping lemma for regular sets.
4. Construct a Finite Automata equivalent to the regular expression.
 $(0 + 1)^* (00 + 11) (0 + 1)^*$
5. Design a PDA which recognizes the set of all even length palindromes over $\{a,b\}$.
6. Discuss the relation between languages and types of automata with help of diagram.

SECTION-C

7. Give proof for the statement: If L is a context free language, then we can construct a PDA A accepting L by empty store, i.e. $L = N(A)$.
8. **Explain the following :**
 - a) What are closure properties of CFLs?
 - b) What is Turing machine and its halting problem?
9. **Explain :**
 - a) Intractability
 - b) CNF vs GNF.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.